MODULE V
LONG-TERM INCINERATION

V. This module covers the long-term incineration activities in the following units:

Section V.A. - Metal Parts Furnace (MPF)
Section V.B. - Liquid Incinerator (LIC)

V.A.1. METAL PARTS FURNACE (MPF)

All numeric values included in any of the Conditions under V.A., which are marked with asterisk (*), are tentative and may be modified in accordance with R315-8-15.5(c) after the trial burn or compliance test results have been evaluated by the Executive Secretary. The Executive Secretary reserves the right to replace these values with any that are determined to be more protective of human health and the environment.

V.A.2. Performance Standards

V.A.2.a. The MPF shall achieve a destruction and removal efficiency (DRE) of 99.99% for the chemical agents and 99.9999% for surrogate trial burn principal organic hazardous constituents (POHC). The DRE shall be calculated by the method specified in R315-8-15.4(a).

V.A.2.b. The particulate matter emission in the exhaust stack, corrected to 7% oxygen in accordance with the formula given below, shall not exceed 0.08 grains per dry standard cubic foot.

$P_c = P_m \times 14/(21 - Y)$
Where:
P_c = corrected concentration of particulate matter
P_m = measured concentration of particulate matter ppm (dry volume)
Y = measured O_2 in the stack gas

V.A.2.c. Hydrogen chloride emissions from the exhaust stack shall not exceed four (4) pounds per hour, or one (1) percent of the total hydrogen chloride in the combustion gas streams from the MPF prior to entering any pollution control equipment, whichever is greater.

V.A.2.d. Toxic metals emissions shall be controlled by limiting the non-embedded metal constituent feed to the MPF in accordance with Table V.1 located at the end of this module.

V.A.2.e. Carbon monoxide concentrations, monitored in the exhaust stack and corrected to 7% oxygen in accordance with the formula specified below, shall not exceed 100 parts per million, dry volume, over a one-hour rolling average.

$CO_c = CO_m \times (21 - 7)/(21 - O_m)$
Where:
CO_c = corrected CO ppm (dry volume)
CO_m = measured CO ppm (dry volume)
O_m = measured % O_2 (dry volume)

V.A.2.f. The Permittee shall continuously monitor and control emissions of chemical agents from the MPF. The stack emissions shall not exceed the following concentrations:

	CHEMICAL AGENT CONCENTRATION (mg/m^3)		
	GB	H/HD/HT	VX
Maximum Stack Emission:	0.0003	0.03	0.0003

V.A.2.g. If current trial burn data is not sufficient to support the GB, VX and Mustard Screening Risk Assessment (SRA) for the Deseret Chemical Depot, at least one compliance test run for each agent shall be conducted to verify stack emissions at the proposed long term incineration feed rates and operating conditions. The Executive Secretary will issue a letter to describe the additional testing requirements.

V.A.3. Waste Feed Limitations

V.A.3.a. The Permittee shall not feed the following wastes to the MPF:

1. RCRA Hazardous Wastes FO20 through FO23, FO26, and FO27.
2. Any wastes containing polychlorinated biphenyls.
3. Any hazardous waste not allowed by this permit.

V.A.3.b. Except during the short-term incineration periods specified in Module VI, the Permittee shall only incinerate the following hazardous waste munitions in MPF:

TYPE OF MUNITION	MAXIMUM FEED RATE*				
	MAXIMUM UNITS PER FURNACE CHARGE*	CHEMICAL AGENTS (pounds/furnace charge)			
		GB	VX	MUSTARD	
Ton Containers	1	130	45	---	
Spray Tanks	1	N/A	45	N/A	
750-lb Bombs, Model MC1	1	19	N/A	N/A	
Wet Eye Bombs, Model MK-116	1	30	N/A	N/A	
155-mm Projectiles	48	24.9	12.8	24.9	
4.2-in. Mortars	75*			45*	
105-mm Cartridge Model M360	75	9.3	N/A	N/A	
8-in Projectiles Model M426	27	33.9	19.6	N/A	
Minimum time interval between furnace feeds*, and length of time* waste must remain in the MPF. (minutes)		86	80	80	

V.A.3.c. Only chemical agents that have been successfully demonstrated during an approved trial burn, or wastes contaminated with such agents, shall be fed to the MPF. Wastes contaminated with more than one agent shall require exhaust stack monitoring for each agent type being treated in accordance with Condition V.A.7.c.

V.A.3.d. Only one-ton container, spray tank or loaded tray containing waste material shall be fed into the MPF at any given time.

V.A.3.e. Table 15.5 in Attachment 15 describes examples of non-munition agent wastes that may be treated in the MPF. The Permittee shall not feed asphalt, carbon, concrete, or soil until testing has been approved by the Executive Secretary following the procedures in R315-3-4. The maximum amounts of non-munition wastes fed to the MPF per furnace charge shall not exceed the following limits.

V.A.3.e.i. Combustible solids feed shall not exceed 377* lb per charge.

V.A.3.e.ii. Non-combustible solids feed shall not exceed 1,919* lb per charge.

V.A.3.e.iii. Total liquid feed shall not exceed 109* lb per charge.

V.A.3.e.iv. Total waste heat input shall not exceed 2,374,093* BTU per charge.

V.A.3.e.v. Total feed ash content shall not exceed 8.26* lb per charge.

V.A.3.e.vi. Total chlorine content shall not exceed 93.89* lb per charge.

V.A.3.e.vii. The minimum time interval between furnace charges shall be no less than 80* minutes, and the waste shall remain in the MPF PCC for at least 120* minutes.

V.A.3.f. Decontamination solutions shall only be processed as a batch feed to the primary combustion chamber of the MPF. Maximum amount of feed per furnace charge shall not exceed 109* pounds. Minimum time interval between these batch furnace feeds shall be no less than 80* minutes and the waste shall remain in the MPF for at least 80* minutes.

V.A.3.g. Agent contaminated liquid wastes identified in Table 15.5 shall only be processed as a batch feed to the primary combustion chamber of the MPF. Maximum amount of feed per furnace charge shall not exceed 109* pounds. Minimum time interval between these batch furnace feeds shall be no less than 80* minutes and the waste shall remain in the MPF for at least 80* minutes.

V.A.3.h. All non-munition wastes that envelop an interior space (e.g. gauges, cans, escape air tanks, over packs, pumps, glassware, etc.) must be opened or punctured before being placed in the MPF. Drums and other containers shall be emptied of their contents before being placed in the MPF.

V.A.3.i. The amount of chemical agent remaining in a ton container, spray tank or munitions shall not exceed the following limits:

i. GB 8.7*% by weight
ii. VX 3.0*% by weight
iii. Mustards - to be determined after the compliance test*

V.A.3.j. Reserved.

V.A.3.k. Hazardous wastes shall not be fed to the secondary combustion chamber of the MPF.

V.A.3.l. Hazardous waste shall not be placed in the MPF when either the carbon monoxide (CO) or oxygen (O_2) CEMS monitors are off-line for calibration or maintenance.

V.A.3.m. The volatile metal feed rates are based upon trial burn tests and verified by the latest Tier III Screening Risk Assessment (SRA) for the DCD facility. Waste feed rates may be adjusted for subsequent SRA re-evaluations, but shall not exceed the quantities demonstrated in the successful trial burn or compliance test.

V.A.4. Operating Conditions

V.A.4.a. After an approval of an agent or surrogate trial burn or compliance test, the Permitee shall comply with the long-term incineration operating conditions for that specific waste.

V.A.4.b. Waste munitions and hazardous waste materials shall remain in the furnace for the minimum time as specified in section V.A.3.b. During this period the primary and secondary combustion chamber temperatures shall be automatically controlled within the limits specified in the Long Term Incineration Module of this permit.

V.A.4.c. The temperature of the two zones of the primary chamber shall be maintained at or above 950* °F, but shall not exceed 1,750* °F.

V.A.4.d. The MPF secondary combustion chamber temperature shall be maintained at or above 1,450* °F, but shall not exceed 2,175* °F.

V.A.4.e. Carbon monoxide concentration, monitored in the exhaust stack and corrected to 7% oxygen in accordance with the formula specified R315-8-15.4(a)(2)(b), shall not exceed 100 parts per million, dry volume, over a one hour rolling average.

V.A.4.f. Oxygen concentration at the exhaust stack shall be maintained at or above 3*%, but shall not exceed 18*% on a dry volume basis.

V.A.4.g. The gas flow rate in the MPF exhaust stack shall be maintained between 6,500* and 13,600* ACFM.

V.A.4.h. The Permittee shall control fugitive emissions from the primary combustion zones of the MPF by maintaining a vacuum in the primary combustion chambers whenever the furnace exit door is closed.

V.A.4.i. The Venturi scrubber exhaust gas temperature shall not exceed 190* °F.

V.A.4.j. Exhaust gas pressure drop across the venturi scrubber shall be maintained at or above 20* inches of water column.

V.A.4.k. Clear liquor flow rate to the scrubber tower shall be maintained at or above 150* gpm.

V.A.4.l. Scrubber brine feed rate to the venturi scrubber shall be maintained at or above 30* gallons per minute.

V.A.4.m. The clear liquor and the scrubber brine shall be continuously monitored and maintained at a pH of 7.0* or above.

V.A.4.n. The Permittee shall continuously monitor and control the agent emissions from the MPF system. The emission levels shall not exceed the agent concentrations specified in condition V.A.2.f.

V.A.5. Waste Feed Cut-Off Requirements

V.A.5.a. The Permittee shall maintain the waste feed cut-off instruments, specified in Table 15.6 of Attachment 15. These devices shall be designed to automatically cut off the hazardous waste feed to the MPF when the monitored operating conditions exceed the set points specified in Table 15.6.

V.A.5.b. Hazardous wastes shall not be fed to the MPF if any of the waste feed cut-off instruments listed in Table 15.6 in Attachment 15 fail to operate as designed.

V.A.5.c. In the event of a malfunction of an automatic waste feed cut-off instrument, the Permittee shall immediately stop the hazardous waste feed to the MPF and correct the malfunction prior to resuming feed.

V.A.5.d. All waste feed cut-off instruments and monitors shall be tested at least every 14-calendar days when wastes are being treated in the MPF.

V.A.6. Inspection Requirements

V.A.6.a. The Permittee shall inspect the MPF in accordance with the Inspection Schedule, Attachments 5.

V.A.6.b. The WFCO test for the MPF shall be witnessed by a DSHW inspector at least once per year to verify the alarm set points for each WFCO instrument. The facility shall notify DSHW at least seven days prior to this test.

V.A.7. Monitoring Requirements

V.A.7.a. The Permittee shall maintain, calibrate, and operate process monitoring, control, and recording equipment, as specified in Attachments 3, 16 and 17.

V.A.7.b. Data from the CEMS, NRTs and DAAMS monitors will be used to verify operating parameters and stack emissions.

V.A.7.c. The MPF Stack shall be continuously monitored, by both NRT monitors and DAAMS, at the SEL level for all agents being processed in the facility. The MPF exhaust stack shall have two staggered NRT monitors with differing columns and two identical NRT monitors for backup, so there is one NRT detector continuously sampling the MPF stack gases at all times whenever hazardous wastes are being fed to the furnace system. DAAMS are used as confirmation for any NRT alarms above the action level. A Waste Feed Cutoff for the MPF is initiated when; 1) there is an alarm at or above the 0.2 SEL action level or 2) when the NRT monitoring systems are not continuously sampling the stack gases.

The Permittee shall not process GA until the Executive Secretary approves a baseline and precision & accuracy study for GA NRT monitoring.

V.A.7.d. Upon receipt of a written request from the Executive Secretary, the Permittee shall perform sampling and analysis of the waste and exhaust emissions to verify that the operating requirements and the performance standards established in this permit are still in compliance after the trial burn period.

V.A.7.e. The following conditions apply to operation and monitoring in the MPF discharge enclosure during processing:

V.A.7.e.i. Each burn tray or bulk container exiting the MPF will be monitored via NRT, with DAAMS confirmation if required, for the presence of chemical agent in the ventilated discharge enclosure prior to transfer to the cooling station area. Prior to the start of agent monitoring, each tray will be allowed to cool under the discharge enclosure until the temperature measured in the ventilation duct at the monitoring probe location is below 200 °F. The discharged item will then be monitored for two complete NRT cycles to determine whether it may be moved out of the ventilated discharge enclosure.

V.A.7.e.ii. If chemical agent is detected greater than or equal to 0.20 STEL for any agent being processed, DAAMS confirmation tube samples will be pulled, and then the burn tray will be moved back into PCC Zone 2 for a minimum of 15 minutes additional processing time. If two consecutive NRT cycles or the DAAMS confirmation tube results verify the agent level to be less than or equal to 0.2 STEL, the burn tray may be transferred out of the discharge enclosure to the MPF cooling area.

V.A.7.e.iii. Each burn tray or bulk container will be monitored visually by an MPF operator for the presence of smoke and/or flame; 1) prior to removal from the furnace, 2) and during transfer, of the burn tray or bulk container, out for the discharge enclosure to the cooling station area. If smoke and/or flames are observed emitting from the burn tray or bulk container, the item shall be returned to the MPF PCC Zone 2 for a minimum of 15 additional minutes.

V.A.7.e.iv. The MPF discharge enclosure NRT monitor sample probe assembly will be retracted from the ventilation duct, except when burn trays are being monitored. During VX waste processing, the two V/G conversion pads at the probe end of the sample line will be changed prior to monitoring each burn tray. During MPF waste treatment operations, the end of the sample line for the discharge enclosure NRT will be challenged daily at the 0.20 and 1.00 STEL levels. Sample line challenges will be at the probe end of the sample line.

V.A.7.e.v. Continuous DAAMS monitoring will be performed in the burn tray/ bulk container cooling area during MPF waste treatment operations. MPF cooling area DAAMS tubes will have a 12-hour aspiration time and must be analyzed within 72 hours of collection.

V.A.8. Record Keeping

V.A.8.a. The Permittee shall record and maintain, in the operating record for the MPF, all monitoring and inspection data compiled under the requirements, in accordance with Condition II.H.

V.A.8.b. The Permittee shall record in the operating record the date, time, and duration of all automatic waste feed shut-offs, including the triggering parameters, reason for the deviation, and corrective measures taken to abort recurrence of the incident. The Permittee shall also record all incidents of the automatic waste feed cut-off function failures, including the corrective measures taken to alleviate the condition that caused the failure.

V.A.8.c. All agent monitoring equipment maintenance, calibration and test data shall be recorded and the records shall be placed in the operating record of the MPF. All NRT readings shall be recorded in the data acquisition system.

V.A.8.d. The following items pertaining to MPF discharge enclosure operation and monitoring shall be documented in the facility operating record daily during processing:

V.A.8.d.i. The time the tray entered the discharge enclosure.

V.A.8.d.ii. The time agent monitoring started and temperature in the discharge enclosure ventilation duct.

V.A.8.d.iii. The agent monitoring readings at the discharge enclosure NRT station (20).

V.A.8.d.iv. The time of the daily sample line challenges at 0.20 and 1.00 STEL.

V.A.8.d.v. The time the tray exited the discharge enclosure into the cooling station area.

V.A.8.d.vi. Records of visual observations required by V.A.7.e.iii (ie if smoke and/or flame are observed from the discharged tray.

V.A.9. Closure

V.A.9.a. At closure, the Permittee shall follow the procedures in the Closure Plan, Attachment 10.

V.B.1. LIQUID INCINERATOR (LIC)

All numeric values included in any of the Conditions under V.B., which are marked with asterisk (*), are tentative and may be modified in accordance with R315-8-15.5(c) after the trial burn or compliance test results have been evaluated by the Executive Secretary. The Executive Secretary reserves the right to replace these values with any that are determined to be more protective of human health and the environment.

V.B.2. Performance Standards

V.B.2.a. The LIC shall achieve a destruction and removal efficiency (DRE) of 99.9999% for the chemical agents and 99.9999% for surrogate trial burn principal organic hazardous constituents (POHC). The DRE shall be calculated by the method specified in R315-8-15.4(a).

V.B.2.b. The particulate matter emission in the exhaust stack, corrected to 7% oxygen in accordance with the formula given below, shall not exceed 0.08 grains per dry standard cubic foot.

$P_c = P_m \times 14/(21 - Y)$

Where:

P_c = corrected concentration of particulate matter
P_m = measured concentration of particulate matter ppm (dry volume)
Y = measured O_2 in the stack gas

V.B.2.c. Hydrogen chloride emissions from the exhaust stack shall not exceed four (4) pounds per hour, or one (1) percent of the total hydrogen chloride in the combustion gas streams from the LIC prior to entering any pollution control equipment, whichever is greater.

V.B.2.d. Toxic metals emissions shall be controlled by limiting the metal constituent feed to the LIC in accordance with the most current Tier III Screening Risk Assessment findings.

V.B.2.e. Carbon monoxide concentrations, monitored in the exhaust stack and corrected to 7% oxygen in accordance with the formula specified below, shall not exceed 100 parts per million, dry volume, over a one-hour rolling average.

$CO_c = CO_m \times (21 - 7)/(21 - O_m)$

Where:

CO_c = corrected CO ppm (dry volume)
CO_m = measured CO ppm (dry volume)
O_m = measured % O_2 (dry volume)

V.B.2.f. The Permittee shall continuously monitor and control emissions of chemical agents from the LIC. The stack emissions shall not exceed the following concentrations:

	CHEMICAL AGENT CONCENTRATION (mg/m^3)		
	GB	H/HD/HT	VX
Maximum Stack Emission:	0.0003	0.03	0.0003

V.B.2.g. If current trial burn data is not sufficient to support the GB, VX and Mustard Screening Risk Assessment (SRA) for the Deseret Chemical Depot, at least one compliance test run for each agent shall be conducted to verify stack emissions at the proposed long term incineration feed rates and operating conditions. The Executive Secretary will issue a letter to describe the additional testing requirements.

V.B.3. <u>Waste Feed Limitations</u>

V.B.3.a. The Permittee shall not feed the following wastes to the LIC:

1. RCRA Hazardous Wastes FO20 through FO23, FO26, and FO27.
2. Any wastes containing polychlorinated biphenyls.
3. Any hazardous waste not allowed by this permit.

V.B.3.b. Except during the short-term incineration periods specified in Module VI, the Permittee shall only incinerate the following hazardous waste munitions in LIC:

DESCRIPTION OF HAZARDOUS WASTES	MAXIMUM FEED TO THE PRIMARY COMBUSTION CHAMBER (LBS/HOUR)*	MAXIMUM FEED TO THE SECONDARY COMBUSTION CHAMBER (LBS/HOUR)*
Chemical Agent GB	300	0
Chemical Agent VX	240	0
Mustard AgentsH/HD/HT	300	0
Surrogate Materials	380	0
Decontamination Solutions	0	180
AgentContaminated LiquidWastes	120	0

V.B.3.c. Only one type of waste shall be fed to the LIC primary combustion chamber at a time.

V.B.3.d. Decontamination solution may be fed to the LIC secondary combustion chamber, with or without waste feed to the primary combustion chamber.

V.B.3.e. The following agent contaminated liquid wastes that may be treated in the LIC:

Fuel Oil,
Hydraulic Fluid,
Lubricating Oil,
Waste Surrogate Test Materials.

The maximum feed rate to the LIC shall not exceed the amounts specified in Condition V.B.3.b.

V.B.3.f. The feed rate of chlorine to the LIC shall not exceed 75* pounds per hour.

V.B.3.g. Hazardous waste shall not be placed in the LIC when either the carbon monoxide (CO) or oxygen (O_2) CEMS monitors are off-line for calibration or maintenance.

V.B.3.h. The volatile metal feed rates are based upon trial burn tests and verified by the latest Tier III Screening Risk Assessment (SRA) for the DCD facility. Waste feed rates may be adjusted for subsequent SRA re-evaluations, but shall not exceed the quantities demonstrated in the successful trial burn or compliance test.

V.B.4. Operating Conditions

V.B.4.a. After an approval of an agent or surrogate trial burn or compliance test, the Permitee shall comply with the long-term incineration operating conditions for that specific waste.

V.B.4.b. The temperature of the primary combustion chamber shall be maintained at or above 2,300* °F, but shall not exceed 3,100* °F.

V.B.4.c.. The LIC secondary combustion chamber temperature shall be maintained at or above 1,800* °F, but shall not exceed 2,600* °F.

V.B.4.d. Carbon monoxide concentrations, monitored in the exhaust stack and corrected to 7% oxygen in accordance with the formula specified below, shall not exceed 100 parts per million, dry volume, over a one-hour rolling average.

$CO_c = CO_m \times (21 - 7)/(21 - O_m)$
Where:
CO_c = corrected CO ppm (dry volume)
CO_m = measured CO ppm (dry volume)
O_m = measured % O_2 (dry volume)

V.B.4.e. Oxygen concentration in the exhaust stack shall be maintained at or above 3%*, but shall not exceed 15%* on a dry volume basis.

V.B.4.f. The gas flow rate in the LIC exhaust stack shall be maintained between 6,500* and 13,600* ACFM.

V.B.4.g. The Permittee shall control fugitive emissions from the primary combustion zones of the LIC by maintaining a vacuum in the primary combustion chamber.

V.B.4.h. The Venturi scrubber exhaust gas temperature shall not exceed 190* °F.

V.B.4.i. Exhaust gas pressure drop across the venturi scrubber shall be maintained at or above 20* inches of water column.

V.B.4.j. Clear liquor flow rate to the scrubber tower shall be maintained at or above 150* gpm.

V.B.4.k. Scrubber brine feed rate to the venturi shall be maintained at or above 30* gallons per minute.

V.B.4.l. The clear liquor and the scrubber brine shall be continuously monitored and maintained at a pH of 7.0* or above.

V.B.5. Waste Feed Cut-Off Requirements

V.B.5.a. The Permittee shall maintain the waste feed cut-off instruments, specified in Table 15.8 of Attachment 15. These devices shall be designed to automatically cut off the hazardous waste feed to the LIC when the monitored operating conditions exceed the set points specified in Table 15.8.

V.B.5.b. If any of the waste feed cut-off instruments and monitors identified in Table 15.8 of Attachment 15 are inoperative, hazardous wastes shall not be placed into the LIC.

V.B.5.c. In the event of a malfunction of an automatic waste feed cut-off instrument, the Permittee shall immediately stop the hazardous waste feed to the LIC and correct the malfunction prior to resuming feed.

V.B.5.d. All waste feed cut-off instruments and monitors shall be tested at least every 14-calender days when wastes are being treated in the LIC.

V.B.6. Inspection Requirements

V.B.6.a. The Permittee shall inspect the LIC in accordance with the Inspection Schedule, Attachments 5.

V.B.6.b. The WFCO test for the LIC shall be witnessed by a DSHW inspector at least once per year to verify the alarm set points for each WFCO instrument. The facility shall notify DSHW at least seven days prior to this test.

V.B.7. Monitoring Requirements

V.B.7.a. The Permittee shall maintain, calibrate, and operate process monitoring, control, and recording equipment, as specified in Attachments 3, 16 and 17.

V.B.7.b. Data from the CEMS, NRT and DAAMS monitors will be used to verify operating parameters and stack emissions.

V.B.7.c. The LIC shall be continuously monitored, by both NRT monitors and DAAMS, at the SEL level for all agents being processed in the facility. The LIC exhaust stack shall have two staggered NRT monitors with differing columns and two identical NRT monitors for backup, so there is one NRT detector continuously sampling the LIC stack gases at all times whenever hazardous wastes are being fed to the furnace system. DAAMS are used as confirmation for any NRT alarms above the action level. A Waste Feed Cutoff for the LIC is initiated when; 1) there is an alarm at or above the 0.2 SEL action level or 2) when the NRT monitoring systems are not continuously sampling the stack gases.

The Permittee shall not process GA until the Executive Secretary approves a baseline and precision & accuracy study for GA NRT monitoring.

V.B.7.d. Upon receipt of a written request from the Executive Secretary, the Permittee shall perform sampling and analysis of the waste and exhaust emissions to verify that the operating requirements and the performance standards established in this permit are still in compliance after the trial burn period.

V.B.8. Record Keeping

V.B.8.a. The Permittee shall record and maintain, in the operating record for the LIC, all monitoring and inspection data compiled under the requirements, in accordance with Condition II.H.

V.B.8.b. The Permittee shall record in the operating record the date, time, and duration of all automatic waste feed shut-offs, including the triggering parameters, reason for the deviation, and corrective measures taken to abort recurrence of the incident. The Permittee shall also record all incidents of the automatic waste feed cut-off function failures, including the corrective measures taken to alleviate the condition that caused the failure.

V.B.8.c All agent monitoring equipment maintenance, calibration and test data shall be recorded and the records shall be placed in the operating record of the LIC. All NRT readings shall be recorded in the data acquisition system.

V.B.9. Closure

V.B.9.a. At closure, the Permittee shall follow the procedures in the Closure Plan in Attachment 10.

Table V.1 Non-embedded Metal Feed Limits for the MPF[1]

Metals	grams per charge
Aluminum	1600*
Antimony	26*
Arsenic (D004)	16*
Barium (D005)	2.0*
Beryllium	1.4*
Boron	31*
Cadmium (D006)	4.8*
Chromium (D007)	15*
Cobalt	0.017*
Copper	11*
Lead (D008)	77*
Manganese	1.1*
Mercury (D009)	0.44*
Nickel	2.0*
Selenium (D010)	0.023*
Silver (D011)	37*
Thallium	1.7*
Tin	860*
Vanadium	0.021*
Zinc	10*

Note:

1. Non-embedded metals are metals that may vaporize or become entrained in the combustion gas air during thermal treatment.